S/N: 10/577,858 Art Unit: 3663

AMENDMENTS TO THE CLAIMS

The following is a complete listing of the claims indicating the current status of each claim and including amendments currently entered as highlighted.

1-26. (canceled)

- 27. (previously presented)A method for achieving optical amplification of an optical signal passing through an indirect-gap semiconductor, the method comprising the steps of:
 - (a) providing a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a given wavelength, wherein said indirect-gap semiconductor is silicon, and wherein said at least one element is chosen from the group comprising: Gold, Silver, Platinum, Iron, Copper, Zinc, Cobalt, Tellurium, Mercury, Nickel, Sulfur and Manganese; and
 - (b) irradiating a target region of said body of semiconductor with optical illumination of a wavelength shorter than said given wavelength in such a manner as to cause population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.

- 28. (original) The method of claim 27, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.
 - 29. (canceled)
- 30. (original) The method of claim 27, wherein said at least one element is chosen from the group comprising: Gold, Silver and Platinum.
- 31. (original) The method of claim 27, wherein said at least one element includes Gold.
- 32. (original) The method of claim 31, wherein said given wavelength is in the range of 1.2-2.2 micrometers.
- 33. (withdrawn) The method of claim 27, wherein said irradiating is performed using a pulsed laser source.
- 34. (original) The method of claim 27, wherein said irradiating is performed using a substantially continuously irradiating laser source.
- 35. (original) The method of claim 27, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.

36-41. (canceled)

- 42. (previously presented)An apparatus for achieving optical amplification of an optical signal of a given wavelength within a target region of an indirect-gap semiconductor, the apparatus comprising:
 - (a) a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of the given wavelength, wherein said indirect-gap semiconductor is silicon, and wherein said at least one element is chosen from the group comprising: Gold, Silver, Platinum, Iron, Copper, Zinc, Cobalt, Tellurium, Mercury, Nickel, Sulfur and Manganese;
 - (b) an irradiating arrangement configured to generate optical illumination of a wavelength shorter than said given wavelength and deployed for irradiating a target region of said body of semiconductor with said optical illumination in such a manner as to generate population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.
- 43. (previously presented) The apparatus of claim 42, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.

- 44. (canceled)
- 45. (previously presented) The apparatus of claim 42, wherein said at least one element is chosen from the group comprising: Gold, Silver and Platinum.
- 46. (previously presented)The apparatus of claim 42, wherein said at least one element includes Gold.
- 47. (previously presented) The apparatus of claim 46, wherein said given wavelength is in the range of 1.2-2.2 micrometers.
- 48. (withdrawn) The apparatus of claim 42, wherein said irradiating is performed using a pulsed laser source.
- 49. (previously presented) The apparatus of claim 42, wherein said irradiating is performed using a substantially continuously irradiating laser source.
- 50. (previously presented) The apparatus of claim 42, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.
 - 51. (canceled)
- 52. (new) A method for achieving optical amplification of an optical signal passing through an indirect-gap semiconductor, the method comprising the steps of:

- (a) providing a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a given wavelength, wherein said at least one element is non-isoelectronic with atoms of
- (b) irradiating a target region of said body of semiconductor with optical illumination of a wavelength shorter than said given wavelength in such a manner as to cause population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.

said indirect-gap semiconductor; and

- 53. (new) The method of claim 52, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.
- 54. (new) The method of claim 52, wherein said given wavelength is in the range of 1.2-2.2 micrometers.
- 55. (new) The method of claim 52, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.